Haldane, M.P., Secretary of State for War; Sir John Murray, K.C.B.; Sir J. A. Russell, inspector of anatomy for Scotland.

(3) Ireland:—Dr. Jas. Little, professor of physic, University of Dublin; Prof. John Pentland Mahaffy, senior fellow, Trinity College, Dublin, late professor of ancient history.

(4) Other Countries:—Yacoub Artin Pasha, Under-Secretary of State for Education, and president of the Institute of Egypt, Cairo; Dr. G. Stanley Hall, professor of psychology, Clark University, Worcester, Mass., America; Prof. H. J. Hamburger, professor of physiology, Groningen; Prof. O. Kellner, K. S. Landwirthschaftliche Versuchsstation, Möckern, Leipzig; Prof. Oscar Liebreich, professor of pharmacology, University of Berlin; Prof. Friedrich Trendelenburg, professor of surgery, University of Leipzig.

The great event of Thursday was the opening of the new buildings at Marischal College by the King and Queen. The whole of the large quadrangle was filled with a sea of faces, and Dr. Marshall Mackenzie's "granite miracle" was the subject of universal admiration. The Principal read an address from the University, and His Majesty in a strong voice declared the buildings open. The Rector asked leave to present the following gentlemen:—

Mr. Alexander M. Gordon, Mr. Alexander Wilson, Dr. William Dey, Dr. Angus Fraser, Dr. David Littlejohn, Dr. Albert Westland, Prof. Matthew Hay, Prof. John Harrower, Prof. Neil J. D. Kennedy, Prof. Robert W. Reid, Prof. James W. H. Trail, Prof. Henry Cowan, Prof. James B. Baillie, Prof. Stephenson, Prof. Charles Niven, Prof. David J. Hamilton, Prof. Alexander Ogston, Prof. William M. Ramsay, Mr. Patrick Cooper, Mr. Theodore Crombie, Dr. John Fleming, Mr. Alexander O. Gill, Mr. David M. M. Milligan, Mr. James Murray, M.P., Mr. Andrew R. Williamson, Mr. A. Marshall Mackenzie, A.R.S.A., the architect, and Mr. W. Wilfred Campbell.

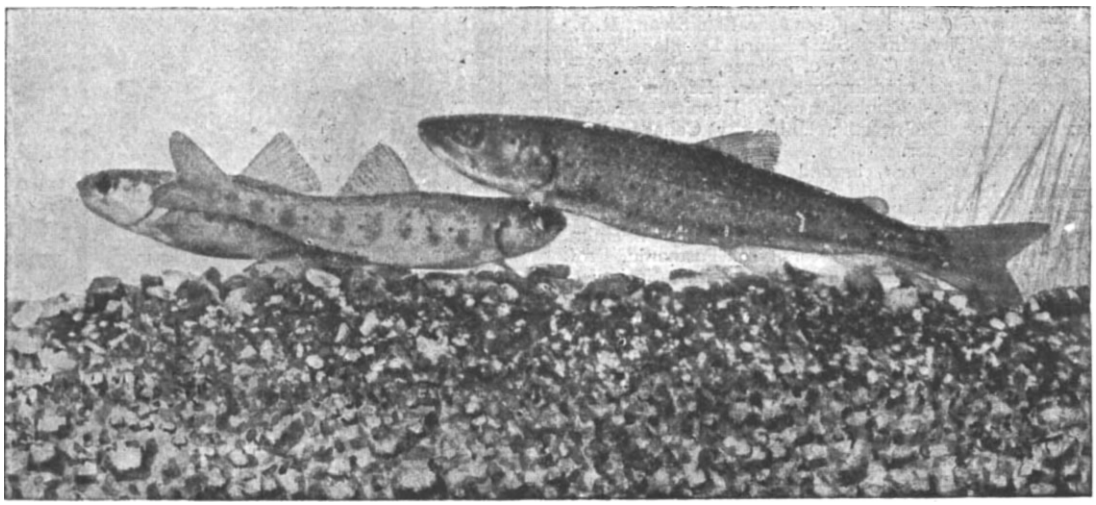
Their Majesties afterwards visited the parts of the new buildings devoted to agriculture and modern languages, and showed great interest in their equipment.

The success of the University celebrations surpassed even the most sanguine expectations, and was attributable to a combination of factors. The weather, though technically autumnal, was better than the best Aberdonian summer. The solemn commemoration of a past four hundred years happily coincided with entering into the possession of a new legacy which makes the University's outlook on the future hopeful. The response to the University's invitation on the part of sister institutions and her own sons and daughters was exceedingly hearty. What began as a primarily academic ceremony broadened out into a civic festival, partly through the kindness of their Majesties, partly through Lord Strathcona's princely generosity, and partly because of the cordiality of the relations between town and gown. But there can be no overlooking the fact that the success of the celebrations was the natural reward of most thoughtful and detailed organisation, of putting brains as well as goodwill into an arduous task. *Vivat, crescat, floreat Universitas Aberdonensis.*

TWO BOOKS ON ANGLING.[1]

IN "Salmon Fishing" Mr. Hodgson deals with the spirit, rather than the technique, of the sport. The first half-dozen chapters of the book are a series of essays on different aspects of fishing, and they are written in a most attractive manner and provide excellent reading. In the chapter on the "Elusive quarry," for instance, the instincts, or rather whims, of the salmon are written about very pleasantly. Mr. Hodgson discusses the old question as to whether or not the salmon feeds in fresh water, and is inclined to think that when the fish rises to a fly it does so with the intention of eating. Evidence against this contention was collected a few years ago by the Scottish Fishery Board, and it was shown that the epithelium of the stomachs of salmon in fresh water was in a catarrhal condition that made digestion impossible. It is, on the whole, the simplest solution of this question that the salmon, when it rises to a fly, does so urged by some kind of sporting instinct.

Mr. Hodgson's book is, however, very practical as well as entertaining. Three chapters are devoted to an account of the salmon rivers of the United Kingdom, and in one very useful chapter there is an excellent account of salmon passes and some useful



Non-migratory Danube salmon, and British fish, in the Thames. The small fish, natives in British waters, are four times the age of the less small—an alien from the Danube. From "Salmon Fishing," by W. Earl Hodgson.

[1] "Salmon Fishing." By W. Earl Hodgson. Pp. xi+314. (London: A. and C. Black, 1906.) Price 7s. 6d. net.
"The Science of Dry Fly Fishing." By Fred. G. Shaw. Pp. xii+142. (London: Bradbury, Agnew and Co., Ltd., 1906.) Price 3s. 6d. net.

suggestions as to their improvement. The account of the British and Irish rivers is rather depressing reading. Almost everywhere, save in a few favoured counties, there is the tale of pollution. We agree with Mr. Hodgson that this is preventable. The crude by-products of various manufactures need never be turned into fishing rivers—such a thing, for instance, as the reckless discharge of sawdust into a stream, and the consequent destruction of hosts of trout, ought certainly not to be permitted. With modern methods of septic purification it is a scandal that salmon rivers and streams should still be the repositories of crude sewage; but local sanitary authorities are difficult to move, and so far as the prevention of the pollution of rivers is concerned the law "is a hass."

The book is excellently printed and illustrated. Particular praise should be given to the series of seven plates at the beginning of the volume illustrating eighty typical salmon flies. The colouring and printing of these plates leave nothing to be desired. Altogether Mr. Hodgson's book should be a very welcome addition to the sportsman's library.

In "Dry Fly Fishing" Mr. F. G. Shaw makes a creditable attempt to make clear that which he terms the "science" of trout fishing. Chapters i. and ii. give directions how, when, and where to cast a trout fly. Chapter iii. deals with the selection of the fly, and includes a discussion of the range of vision of the fish. Chapter iv. gives a useful account of some aspects of pisciculture, and chapter v., "The necessities of the trout fisherman," is devoted to a consideration of the "gear" necessary for the craft. The book is abundantly illustrated. If the niceties of trout fishing can be taught by means of diagrams and practical directions, then Mr. Shaw's book ought to be very useful; but, as he says himself, "It is of no use to read books in order to determine your actions when actually fishing. Common sense is the most valuable guide." Nevertheless, the experience of others is always interesting, and no doubt the tyro, and even those of greater knowledge, will learn much from this work. J. J.

PROF. LUDWIG BOLTZMANN.

ONLY two years ago Dr. Ludwig Boltzmann, professor of physics in the University of Vienna, celebrated his sixtieth birthday. On that occasion a "Festschrift" was presented to him containing papers by about 125 physicists from all parts of the world. The announcement of Prof. Boltzmann's death, which was reported in the London papers of September 8, will be received with regret, not only by physicists of repute, but by every student who has attempted to gain an insight into the mysteries of molecular physics.

Ludwig Boltzmann was born on February 20, 1844. Before he was twenty-two years old, on February 8, 1866, he read a paper before the Academy of Sciences of Vienna entitled "Ueber die mechanische Bedeutung des zweiten Hauptsatzes der Wärmetheorie." The opening sentences of the paper may be freely translated as follows:—

"The identity of the First Law of Thermodynamics with the principle of *vis viva* has long been known, on the other hand the Second Law occupies a peculiarly exceptional position, and its proof is based on methods which are not only uncertain here and there, but are in no case obvious. The object of this paper is to furnish a purely analytical and perfectly general proof of the Second Law of Thermodynamics, as well as to investigate the corresponding principle in Mechanics."

Little did the young Boltzmann imagine that the task he had thus set before himself would occupy his whole lifetime.

A year later, after having obtained the doctorate, and having been appointed assistant in the physical institute at Vienna, we find him writing on the number of atoms in a gas molecule and the internal work of gases.

In 1868 he published his first important paper on the law of partition of energy under the title of "Studien über das Gleichgewicht der lebendigen Kraft zwischen bewegten materiellen Punkte." The problem had been previously attacked by Maxwell, but Boltzmann soon found difficulties and objections arising out of Maxwell's treatment, and it was one of the objects of the paper to place the theory on a more satisfactory basis. A second paper on the same subject ("Weitere Studien") was published in 1872, and in it the important theorem now known as Boltzmann's "minimum theorem" or the "H-theorem" first saw the light. That this theorem is not independent of assumed hypotheses has been amply shown by discussions in NATURE and elsewhere in which Watson, Burbury, and other physicists took part early in the 'nineties; but, granting these premises, it is proved that in a system of molecules a tendency exists to assume an equilibrium distribution of energy analogous to the tendency to heat equilibrium in a material gas. It was not until 1892 that Boltzmann published a third part to his "Studien." In it he deals with difficulties that had been raised in the discussion referred to in connection with the assumption that the kinetic energy of the system could be reduced to a sum of squares, and he also examines certain test cases of the kinetic theory proposed by Lord Kelvin.

In 1875 Boltzmann, then a corresponding member of the Vienna Academy of Sciences, treated the problem for the case of a system of molecules in a field of external force.

From Vienna Boltzmann went to Graz, where he was appointed professor in the university. After going there he wrote, in 1876, a paper on the integration of the equations of molecular motion, and several other minor papers on the kinetic theory. A fresh line was started in 1877, although the underlying idea had been suggested by Boltzmann in 1871, and employed by Dr. Oskar Emil Meyer in his book of 1877. This was the application of the theory of probability to the problem of energy-partition. The method of treatment adopted is highly instructive; Boltzmann starts with considering a system of molecules the energy of each of which can only have one or other of a series of discrete values—a series of counters marked 1, 2, 3 . . . might be used in illustration—and he investigates the most probable distribution of energy for a number of them drawn at random. From this simple case he is led by gradual stages to the more complicated case of a gas the molecular state of which is specified by generalised coordinates.

In 1880 to 1882 Boltzmann published long and important papers on viscosity and diffusion of gases, in which the consequences of Maxwell's assumption of the "inverse fifth" law of intermolecular force were fully discussed. In 1884 he was evidently attracted by Helmholtz's work on monocyclic systems, and lost no time in applying the method to the kinetic theory. In this connection the possibility of building up statistically monocyclic systems was considered. But a further application suggested itself in the possibility of representing thermodynamic and other phenomena by means of mechanical models. In his "Vorlesungen über Maxwell's Theorie," pub-